Paper IV(Robotics)

INDEX				
NO	**DATE**	**TITLE**	**PAGE NO**	**SIGN**
1		Write a program to create a robot (i) With gear (ii) Without gear and move it forward, left, right		
2		Write a program to create a robot with a two motor and move it forward, left, right		
3		Write a program to do a square using a while loop, doing steps with a for loop, to change directions based on condition, controlling motor speed using switch case,		
4		Write a program to create a robot with light sensors to follow a line		
5		Write a program to create a robot that does a circle using 2 motors		
6		Write a program to create a path following robot		
7		Write a program to resist obstacles		
8		Write a program to implement Torch following robot		

Practical no. 1(a)

Aim : Aim: -Write a program to create a robot with gear and move it forward, left, right

```
import ch.aplu.robotsim.*;
class MoveWithGear
{
  MoveWithGear()
  {
    NxtRobot robot=new NxtRobot();
    Gear gear=new Gear();
    robot.addPart(gear);

    gear.forward(400);
    gear.setSpeed(30);

    gear.left(800);
    gear.forward(200);
    gear.right(480);
    robot.exit();
  }
  public static void main(String args[])
  {
    MoveWithGear  m=new MoveWithGear();
  }
}
```

Output:

Practical no. 1(b)

Aim: -Write a program to create a robot without gear and move it forward, left, right

```
import ch.aplu.robotsim.*;
class MoveWithoutGears
{
  MoveWithoutGears()
  {
    TurtleRobot robot=new TurtleRobot();
    robot.forward(100);
    robot.left(45);
    robot.forward(200);
    robot.right(90);
    robot.backward(100);
    robot.exit();
   }
    public static void main(String args[])
    {
     MoveWithoutGears  m=new MoveWithoutGears();
    }
}
```

Output :

Practical No. 2

Aim: Write a program to create a robot with a two motor and move it forward, left, right

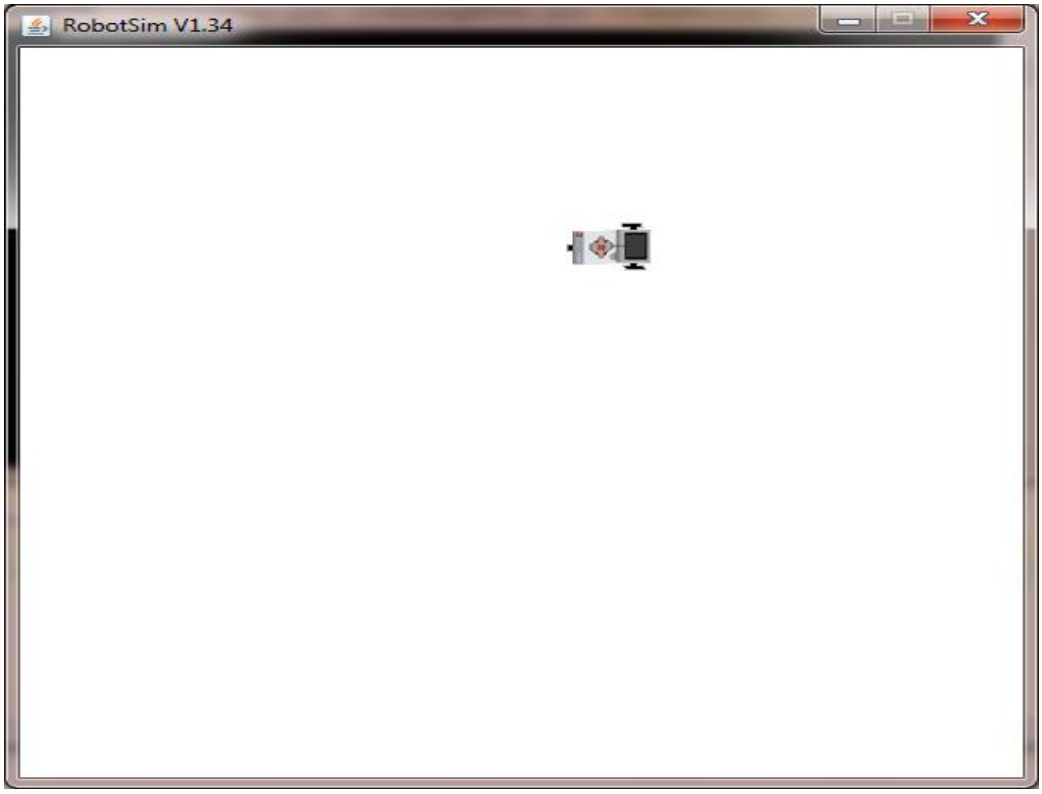
```
import ch.aplu.robotsim.*;
public class MoveWithMotors
{
  public  MoveWithMotors()
  {
    NxtRobot robot=new  NxtRobot();
    Motor motA=new Motor(MotorPort.A);
    Motor motB=new Motor(MotorPort.B);
    robot.addPart(motA);
    robot.addPart(motB);
    motA.forward();
    motB.forward();
    Tools.delay(2000);

    motA.stop();
    Tools.delay(1050);
    motA.forward();
    Tools.delay(2000);

    motB.stop();
    Tools.delay(1050);
    motB.forward();
    Tools.delay(2000);

    robot.exit();
  }
  public static void main(String args[])
  {
    new MoveWithMotors();
  }
}
```

Output:



Practical no. 3

Aim: Write a program to do a square using a while loop, doing steps with a for loop, to change directions based on condition, controlling motor speed using switch case

```
import ch.aplu.robotsim.*;
class square
{
  square()
  {
    NxtRobot r = new NxtRobot();
    Gear g = new Gear();
    r.addPart(g);
    g.setSpeed(100);
    g.forward(1000);
    g.left(275);
    g.forward(1000);
    g.left(275);
    g.forward(1000);
    g.left(275);
    g.forward(1000);
    Tools.delay(2000);
    r.exit();
  }
  public static void main(String[] args)
  {
    new square();
  }
}
```

Output:

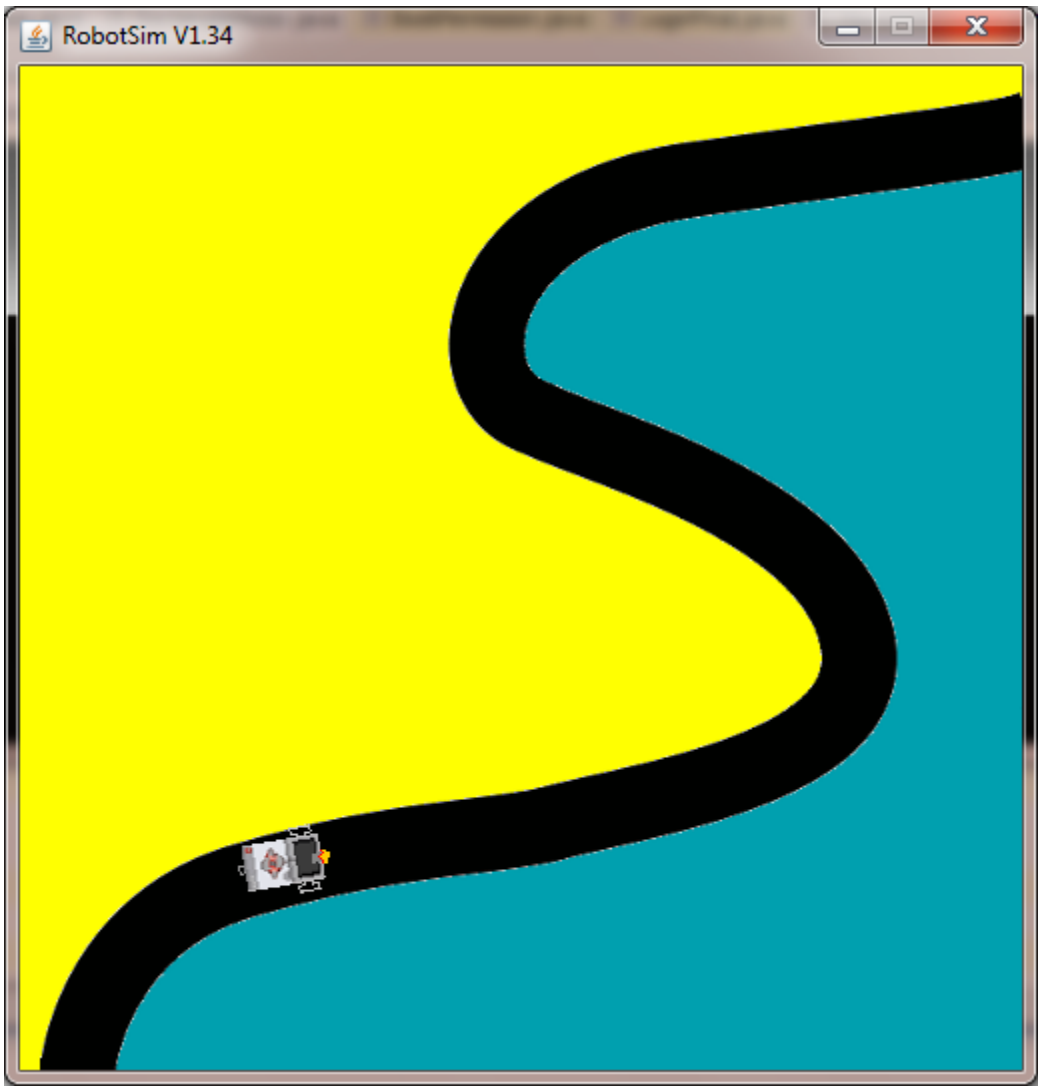
Practical no. 4

Aim: Write a program to create a robot with light sensors to follow a line

```
import ch.aplu.robotsim.*;
public class LineFollower
{
  LineFollower()
  {
    LegoRobot robot=new LegoRobot();
    Gear gear=new Gear();
    LightSensor ls=new LightSensor(SensorPort.S3);
    robot.addPart(gear);
    gear.setSpeed(20);
    robot.addPart(ls);
    while(true)
    {
      int v=ls.getValue();
      if(v < 100)//black
      gear.forward();
      if(v > 300 && v < 750)  //blue
      gear.leftArc(0.05);
      if(v> 800)  //yellow
      gear.rightArc(0.05);
    }
  }
  public static void main(String args[])
  {
    new LineFollower();

  }
  static
  {
    RobotContext.setStartPosition(50,490);
    RobotContext.setStartDirection(-90);
    RobotContext.useBackground("sprites/road.gif");
  }
}
```

Output:

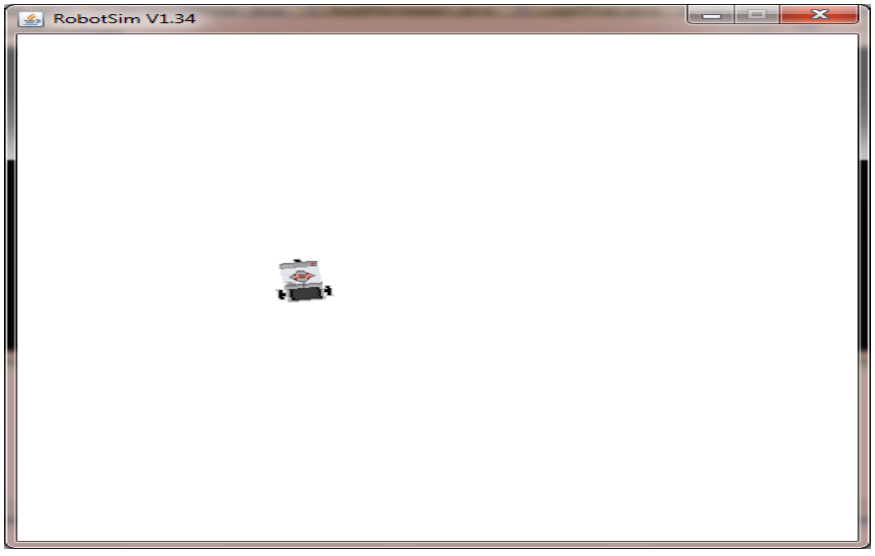


Practical No. 5(a)

Aim: Write a program to create a robot that does a circle using one motor

```
import ch.aplu.robotsim.*;
public class Circlem
{
  Circlem()
  {
    NxtRobot robot=new NxtRobot();
    Gear gear=new Gear();
    robot.addPart(gear);
    gear.setSpeed(60);
    gear.leftArc(0.2,7000);
    gear.rightArc(0.2);
    Tools.delay(5000);
    robot.exit();
  }
  public static void main(String args[])
  {
    new Circlem();
  }
  }
```

Output:



Practical No. 5(b)

Aim: Write a program to create a robot that does a circle using two motors

```
import ch.aplu.robotsim.*;
class CircularGear
{
   CircularGear()
 {
    NxtRobot robot=new NxtRobot();
   Gear gear=new Gear();
   robot.addPart(gear);
  gear.forward(200);
  gear.setSpeed(20);
  gear.leftArc(0.2,7000);
 gear.forward(200);
  gear.leftArc(0.2,7000);
gear.forward(200);
 gear.leftArc(0.2,7000);
gear.forward(200);
    gear.leftArc(0.2,7000);
  gear.forward(200);
 robot.exit();
}
 public static void main(String args[])
{
    CircularGear  m=new  CircularGear();
    NxtContext.setStartPosition(250,200);
   NxtContext.setStartDirection(90);
  }}
```

Output:

Practical No. 6

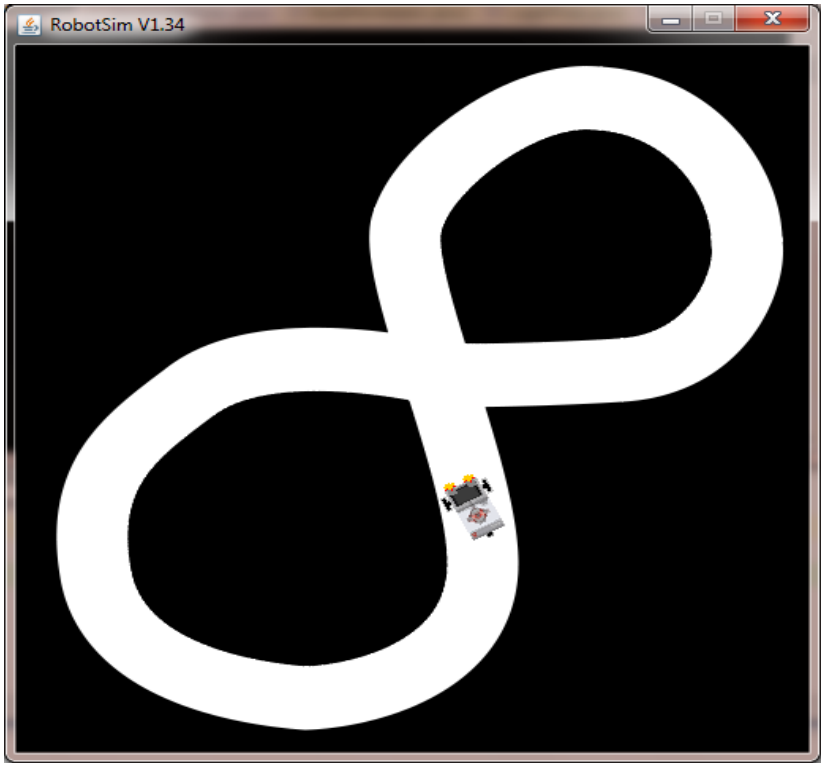
Aim: Write a program to create a path following robot

```
import ch.aplu.robotsim.*;
public class PathFinder
{
  public PathFinder()
  {
    NxtRobot robot=new NxtRobot();
    Gear gear=new Gear();
    LightSensor ls1=new LightSensor(SensorPort.S1);
    LightSensor ls2=new LightSensor(SensorPort.S2);
    robot.addPart(gear);
    robot.addPart(ls1);
    robot.addPart(ls2);
    gear.forward();

    while(true)
    {
      int rightValue=ls1.getValue();
      int leftValue=ls2.getValue();
      int d=rightValue - leftValue;
      if(d>100)
        gear.rightArc(0.1);
      if(d < -100)
        gear.leftArc(0.1);
      if(d > -100 && d < 100 && rightValue > 500)
        gear.forward();
    }
  }
  public static void main(String args[])
  {
     new PathFinder();
  }
  static
  {
    NxtContext.setStartPosition(250,490);
    NxtContext.setStartDirection(-90);
    NxtContext.useBackground("sprites/path.gif");
```

```
  }
}
```

Output:



Practical no. 7

Aim: Write a program to resist obstacles

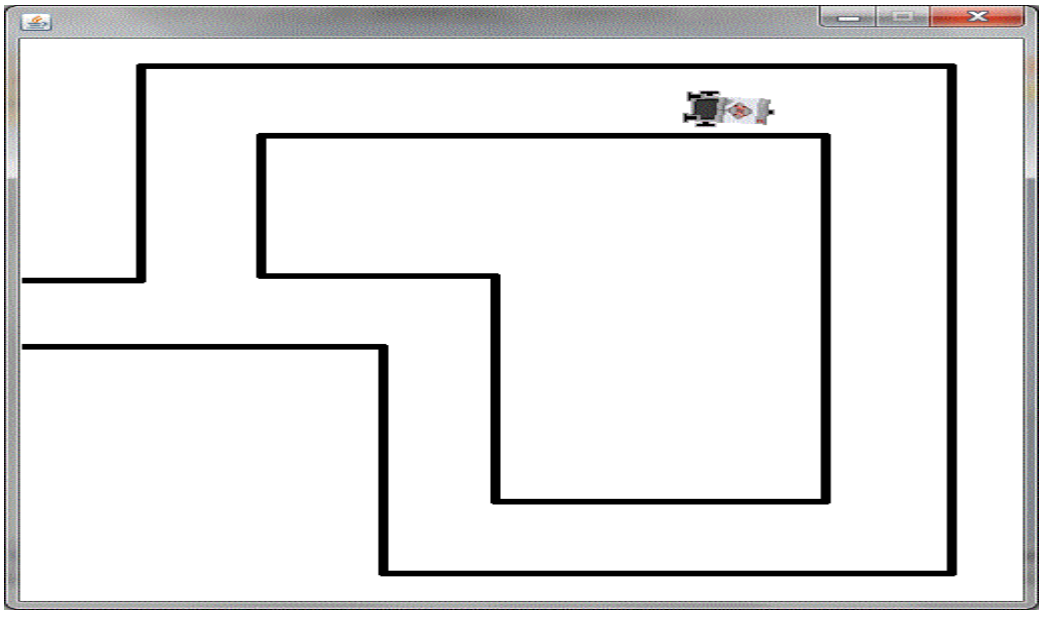
```
import ch.aplu.robotsim.*;
import ch.aplu.util.*;
public class resistobst
{
  public resistobst()
  {
    LegoRobot robot = new LegoRobot();
    Gear g = new Gear();

    TouchSensor ts1 = new TouchSensor(SensorPort.S1);
    TouchSensor ts2 = new TouchSensor(SensorPort.S2);
    robot.addPart(g);
    robot.addPart(ts1);
    robot.addPart(ts2);
    g.forward();
    while(!QuitPane.quit())
    {
      Boolean t1 = ts1.isPressed();
      Boolean t2 = ts2.isPressed();
      if(t1 && t2)
      {
        g.backward(500);
        g.left(400);
        g.forward();
      }
      else
      {
        if(t1)
        {
          g.backward(500);
          g.left(400);
          g.forward();

        }
        else
        {
          if(t2)
```

```
          {
           g.backward(500);
            g.right(100);
            g.forward();
          }
        }
      }
       Tools.delay(20);
    }
    robot.exit();
  }
  public static void main(String [] args)
  {
    new resistobst();
  }
  static
  {
    RobotContext.setLocation(10,10);
    RobotContext.setStartDirection(5);
    RobotContext.setStartPosition(100,240);
    RobotContext.useObstacle(RobotContext.channel);
  }
}
```

Output:



Practical no. 8

Aim: Write a program to implement Torch following robot

```
package TorchFollower;

import ch.aplu.robotsim.Gear;
import ch.aplu.robotsim.LegoRobot;
import ch.aplu.robotsim.LightSensor;
import ch.aplu.robotsim.RobotContext;
import ch.aplu.robotsim.SensorPort;
import ch.aplu.robotsim.Tools;

public class TorchFollower {
   TorchFollower()
   {
    LegoRobot robot = new LegoRobot();
   LightSensor lsFR = new LightSensor(SensorPort.S1, true);
   LightSensor lsFL = new LightSensor(SensorPort.S2, true);
   LightSensor lsRR = new LightSensor(SensorPort.S3, true);
   LightSensor lsRL = new LightSensor(SensorPort.S4, true);

   Gear gear = new Gear();
   robot.addPart(gear);
   robot.addPart(lsFR);
   robot.addPart(lsFL);
   robot.addPart(lsRL);
   robot.addPart(lsRR);

   gear.setSpeed(25);
   gear.forward();
   double s = 0.02;
   while (!robot.isEscapeHit())
   {
     int vFR = lsFR.getValue();
     int vFL = lsFL.getValue();
     int vRR = lsRR.getValue();
     int vRL = lsRL.getValue();
     double d = 1.0 * (vFL - vFR) / (vFL + vFR);
```

```
      if (vRL + vRR > vFL + vFR)  // torch behind robot
        gear.left();
      else if (d > -s && d < s)
        gear.forward();
      else
      {
        if (d >= s)
          gear.leftArc(0.05);
        else
          gear.rightArc(0.05);
      }
      Tools.delay(100);
    }
    robot.exit();
  }

  public static void main(String[] args)
  {
    TorchFollower t =new TorchFollower();
  }
  // ------------------ Environment -------------------------
  static
  {
    RobotContext.useTorch(1, 150, 250, 100);
  }
}
```

Output: